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ABSTRACT

This practicum sought to reduce the delays in referral to otologists for medical care to alleviate hearing losses and reduce risk of delays in language and academic performance. The practicum conducted inservice training programs to improve the identification of conductive pathologies in preschool and school-age children by 34 speech pathologists. The programs aimed to improve speech pathologists' skills in otoscopic visualizations as part of the hearing screening program. Training covered such topics as anatomy and physiology of the outer and middle ear, effects of conductive pathology and associated hearing loss on language development and academic performance, and use and operation of an otoscope. The results of the practicum were positive. Participating speech pathologists achieved 100% mastery on the practicum's behavioral objectives. A reduction in delays in referral to otologists for immediate medical care was also achieved. Several administrative forms and 29 references are included. (JDD)

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Improving Speech Pathologists' Identification of Conductive Pathologies in Preschool and School Age Children Through Inservice Training

by

Joseph A. Guillory

Cluster 31

A Practicum I Report presented to the
Ed.D. Program in Early and Middle Childhood
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

NOVA UNIVERSITY

1989

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PRACTICUM APPROVAL SHEET

This practicum took place as described.

Verifier: Aaron Washington
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Director of Special Education

251 Blair Street Opelousas, Louisiana 70570

December 15, 1989
Date

This practicum report was submitted by Joseph A. Guillory under the direction of the adviser listed below. It was submitted to the Ed.D. Program in Early and Middle Childhood and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova University.

Approved:

February 12, 1990
Date of Final Approval of Report

Mary Ellen Sapp
Mary Ellen Sapp, Ph.D., Adviser

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ABSTRACT

Improving Identification of Conductive Pathologies in Preschool and School Age Children by Speech Pathologists Through Inservice Training. Guillory, Joseph A., 1989: Practicum Report, Nova University, Ed.D. Program in Early and Middle Childhood. Descriptors: Audiology / Auditory Evaluations / Auditory Tests / Communication Disorders / Diagnostic Test / Ear Diseases / Hearing Conservation / Hearing Impairment / Hearing Screening / Identification / Partial Hearing / Screening Tests.

This practicum was designed to improve the identification of conductive pathologies in preschool and school age children by speech pathologists through inservice training. The primary goal was to reduce the significant delays in referral to otologists for immediate medical care to alleviate conductive pathology and reduce the risk of delays in language and academic performance. A secondary goal included the identification of obvious conductive hearing losses at the school building level and the immediate referral to otologists for medical care.

The writer conducted several inservice training programs designed to improve speech pathologists' skills in otoscopic visualizations as part of the hearing screening program. The writer provided training on the anatomy and physiology of the outer and middle ear structures; effects of conductive pathology and associated hearing loss on language development and academic performance; use and operation of an otoscope; identification of pathological conditions of the outer and middle ear structures; requirements and procedures for immediate otologic referral and otoscopic appearance of normal healthy ear structures as compared to abnormal and diseased structures of the outer and middle ear.

The results of the practicum were positive. The goals and objectives of the practicum were met. An analysis of all objectives revealed 100% mastery by all the speech pathologists who participated in the inservice training program. A reduction in significant delays in referral to otologists for immediate medical care to alleviate conductive pathology and reduce the risk of delays in language and academic performance was achieved.

CHAPTER I

INTRODUCTION

Description of Work Setting and Community

This practicum was conducted in a public school system located in a rural area of a southern state. Because of the school system's location and geographical area, the timely provision of services are sometimes delayed.

The school system has a population of 17,000 students and is geographically large, covering an area spanning 930 square miles. The school system evolved from a one building system to its present 47 educational sites. These sites consist of 24 elementary schools located in 17 communities. The school system also has 11 high schools, three junior high schools, one middle school, five special education schools, two vocational education centers and one alternative education facility. In addition, the school system conducts an adult education program with an annual enrollment of around 500 participants, working toward their General Education Diploma.

The overall population of the communities served by the school system is approximately 82,000. Each community has its own socioeconomic makeup ranging from low-to-middle income. The low income group members are employed as laborers who depend on state and local public assistance for survival. The middle income groups in the various communities consist of people employed in various businesses, the school system and other professions. The majority of the children in the school system are from the lower socioeconomic level. They come

from families with limited educational backgrounds, high rate of unemployment, receive public assistance and are black.

The governance of the school system is by a 13 member board, representing the different communities. It provides for the operation and policy for the system and appoints a superintendent who is directly responsible to it regarding board policies and general operation of the system. The superintendent is assisted by two assistant superintendents and 24 central office supervisors and coordinators. The school system employs 2,000 of whom 1,073 are teachers with the remaining employees falling in various support jobs. The school system is the single largest employer in the area and one of the state's largest school systems.

The annual operating budget for the school system is approximately 45 million dollars. Revenues are secured from federal, state and local sources. Approximately 1.1 million dollars of this budget is dedicated to the operation of the special education department for the provision of services to handicapped students.

The local school system provides a number of direct and support services which contributes to the overall development of children.

Writer's Work Setting and Role

The writer is one of three administrators in the special education department, and he is responsible for the administration and supervision of all aspects of the program. The program has a student population of 2,048 students and a teaching and professional staff of 270. The writer supervises and coordinates the pupil appraisal assessment program, supervises the instructional programs,

and is responsible for child search activities to locate unserved or underserved handicapped children. The writer does direct supervision of psychologists, social workers, educational assessment teachers, speech pathologists, and classroom teachers. The major responsibility of the writer is the administration and supervision of the speech, language, and hearing therapy program having an enrollment of 1,100 students and a professional staff of 34 speech pathologists and one audiologist. The writer is responsible for conducting the hearing testing program which involves the hearing screening of all Head Start students, all students in kindergarten, first, second, third, fifth, seventh, ninth, and twelfth grades. The writer is also responsible for the delivery of appropriate follow-up services for those students found to have hearing problems.

The writer's background and training include a master of science degree in psychology and rehabilitation counseling and a master of science degree in audiology. The writer holds state teacher certification in administration and supervision, speech pathology and audiology, behavior disordered, emotionally disturbed, deaf, hard-of-hearing, learning disabled, mentally handicapped and counseling. The writer also holds the Certificate of Clinical Competence in Speech Pathology and Audiology from the American Speech-Language and Hearing Association (ASHA) and has state licensure in both areas. The writer has 21 years' experience in the public school system and is an adjunct professor in speech pathology and audiology at one of the area's largest universities. The writer has also been in private practice in audiology for twelve years.

CHAPTER II

STUDY OF THE PROBLEM

Problem Description

Many children who are given hearing screening and threshold testing by the school system's speech pathologists, and found to have hearing loss, experience significant delays in the referral to an otologist for appropriate medical intervention. Once identified as having hearing loss, the children are referred to the school system's audiologist to determine if in fact a hearing loss does exist. The audiologist also determines the extent and type of hearing loss. If the children are found to have hearing loss, they are then referred to an otologist for medical evaluation and intervention for the alleviation of the hearing problem. The difficulty being encountered was that there was a significant delay from initial identification of the hearing loss by the speech pathologist to the referral to the otologist. During the period of time children were waiting to be tested by the audiologist, they continued to experience the hearing losses. This period of time before referral may vary anywhere from two weeks to three weeks because of the large number of children involved and the areas of the school system from which they come. Another difficulty resulting from this delay in referral was the risk of delays in language and academic performance resulting from the hearing losses. The risk of delay in language and academic performance was magnified during the critical periods of learning for preschoolers and early elementary grade children. Several of the children screened had obvious conductive pathologies of the outer and middle ear structures that may contribute

to the hearing losses. These pathologies are not being identified at the school building level by the speech pathologists. It is these obvious conductive pathologies that should be identified by the speech pathologists during hearing screening and threshold testing, with immediate referral to the otologist, bypassing the audiologist. This much needed step would result in a shorter time span from initial identification to referral to the otologist.

The problem was that there are delays in referral to otologists for immediate care to alleviate hearing losses and reduce risk of delays in language and academic performance. If the problem was solved, children failing hearing screening and otoscopic inspection would be referred immediately to an otologist for prompt medical evaluation and intervention, bypassing the audiologist.

Problem Documentation

The existence of this problem was documented by the review of 146 audiological evaluations performed during the 1988-89 school year. It was also documented by the review of 146 medical evaluations from otologists revealing conductive hearing problems that could have been identified at the school building level by speech pathologists with immediate referral for medical intervention. Problems such as foreign objects in the ear canal, blockage of canal by cerumen, and obvious drainage from the ears were found. Other problems such as tympanic membrane perforations and chronic otitis media were also noted. The majority of the problems diagnosed were otitis media of the serous and chronic state.

Table 1

Referrals for 2nd Semester of 1988-89 School Year

Total Number of Referrals - 146

	Students	Percentage
Diagnosed with Hearing Loss	146	100%
Referred to Otologist	146	100%
Conductive Pathology	146	100%
Sensorineural Hearing Loss	0	0%

Consultations and interviews with seven local otologists substantiate the need for more immediate referral and alleviation of these conductive pathologies. The otologists revealed that in most instances these conductive pathologies which may contribute to hearing losses are of a long standing nature and further delays in referral for medical care only enhance delays in language development and academic performance.

An informal oral survey of thirty-two speech pathologists and one audiologist revealed that significant delays in referrals to otologists were occurring and that there are conductive hearing losses that can be identified at the school building level. They recognized and reported delays in referrals, since these children had to be referred to the school system's audiologist, then to the otologist. They reported that the children continue to experience the conductive hearing problems until appropriate referral and intervention are obtained from the otologist. The speech pathologists and audiologist felt a need for incorporating otoscopic inspection of the outer and

middle ear in the hearing screening program for it would better enable them to identify ear canal abnormalities, tympanic membrane problems, and other obvious middle ear pathology.

A review of audiological evaluations, otologic reports, and interviews with professionals reveal that there are significant delays in referral to otologists for medical intervention to alleviate the conductive pathologies contributing to hearing problems.

Causative Analysis

One factor related to the cause of the problem was that speech pathologists lack knowledge regarding the normal appearance of the outer and middle ear structures. This knowledge is an essential prerequisite in determining what is abnormal or pathological.

Another factor related to the cause of the problem was the speech pathologists' lack of skills in the use of an otoscope to perform an otoscopic inspection. It is necessary to know how to use an otoscope to illuminate the outer and middle ear structures. This knowledge allows for adequate inspection necessary for identification of pathological features indicative of possible conductive pathology and hearing loss.

The most outstanding cause of the problem was that speech pathologists, who are responsible for conducting the hearing screening and threshold testing program at the school building level, are not properly trained in otoscopic inspection of the external ear canal and tympanic membrane. Specifically, they are unable to identify obvious conductive pathologies that require immediate medical intervention. Although the speech pathologists have had some cursory training in

otoscopic inspections, their inexperience hinders their performing this visualization of the ear canal and tympanic membrane. This inexperience also hinders their recognizing obvious structural defects of the ear, ear canal abnormalities, and tympanic membrane disorder which may be indicative of conductive hearing loss and active middle ear disease.

Relationship of the Problem to the Literature

The importance of early identification of hearing loss in children has been reported numerous times in the literature by medical, educational, and allied health professionals. The earlier a hearing loss is identified, the earlier appropriate medical and educational interventions can be implemented to assure development of language and academic skills.

The writer's review of the literature reveals several reports and studies indicating the close association of speech, language, and learning problems resulting from conductive hearing losses. These studies also indicate that the longer the hearing loss exists the more serious the delays may become.

Silva, Chalmers, & Stewart (1986) described a longitudinal study of a group of children having middle ear pathology with a group of children with normal ears at age five. They found that the children with middle ear pathology had moderately high degrees of hearing losses. When these children were compared to the normal hearing group at the ages of five, seven, nine and eleven, in the areas of intelligence, language development, speech articulation, reading attainment, and behavior problems, it was found that significant

differences existed. The group with middle ear pathology, when compared at the various ages, had significant differences in intelligence scores, reading scores, behavior problems, differences in speech articulation and delayed language development. Results from this study reveal that early identification and referral for treatment of middle ear pathology can reduce the risk of delayed language development, lowered intelligence scores, and deficits in reading attainment.

Brandes and Ehinger (1981) reported that middle ear pathology with conductive hearing losses can produce auditory perception disorders and significant delays in academic achievement. Middle ear pathology with conductive hearing losses can also have adverse effects on language development. Results of their study indicated the need for early identification of middle ear pathology and conductive hearing loss, and that aggressive medical intervention and treatment is needed.

Silva, Kirkland, Simpson, Stewart, & Williams (1982) studied the effects of middle ear pathology on verbal comprehension, motor development, behavior, and intelligence. Results revealed significant delays in these areas as compared to a group of children with normal hearing acuity as compared to a group with middle ear pathology. These results revealed the need for early identification of middle ear pathology and immediate referral for medical intervention for alleviation of the hearing losses.

Downs (1981) reported that conductive hearing loss resulting from middle ear pathology is the most frequent type of hearing loss found in school age children. These types of hearing losses can cause

deficits in language development and learning resulting from the lack of adequate auditory stimulation. The delay in early identification of middle ear pathology and appropriate medical intervention can only increase the likelihood of delayed language acquisition and learning problems.

Compagnone, Connors, & Stata (1988) addressed concerns regarding middle ear disease and significant delays in speech, language, and cognitive skills. Relatively mild conductive losses in childhood can result in communication disabilities, especially if the hearing loss goes undetected or untreated. Results can be long-lasting and irreversible. Mild language deficits caused by middle ear disease can produce severe reading and spelling difficulties. Early detection of middle ear pathology is important to help prevent language and learning problems.

Bess (1985) reviewed evidence from several studies which suggests that middle ear disease with effusion and associated hearing loss can result in educational and communicative difficulty. These studies point to the need for earlier and more active identification and management of middle ear pathology with associated hearing losses.

Johnson, Mandell, & Quick (1983) reported that fluctuating hearing losses associated with middle ear pathology has significant adverse effects on a young child's speech and language development and learning skills. Comprehensive intervention programs that identify children with middle ear pathology are recommended and will assist in preventing language and learning problems resulting from middle ear pathology and associated fluctuating hearing losses. Immediate referral for medical intervention for alleviation of the hearing losses

is critical.

In a policy statement, the American Academy of Pediatrics (1984) reported that there is growing evidence that depicts a correlation between middle ear disease with hearing loss and delays in the development of speech, language and cognitive skills. This statement presents the need for early identification of middle ear pathology and immediate referral for medical intervention for treatment of the hearing losses.

Other researchers found that mild and moderate degrees of hearing loss can interfere with a child's language development and learning skills. Davis, Elfenbein, Schum & Bentler (1986) revealed that hearing loss of any degree appeared to affect psychoeducational development to a great degree. Even minimal hearing loss places children at risk for language and educational problems.

Downs (1982) revealed that long-standing hearing losses in children are associated with problems in cognitive skill development and school achievement. Thirty studies involving 3,500 children who had early fluctuating hearing loss associated with middle ear pathology, demonstrated decreased learning skills. Early identification and referral for medical intervention are needed. Zinkus and Gottlieb (1980) found that subjects with a history of recurrent otitis media were slower in developing word combinations, had lower verbal intelligence scores, had difficulty in auditory processing, and were extremely poorer in reading. A group of 60 normal hearing children with no middle ear disease and a group of 60 children with middle ear disease were studied to complete the research and its findings.

Kessler and Randolph (1979) compared 29 third grade children who presented histories of middle ear pathology with a control group of 19 third grade students with normal hearing and no history of middle ear pathology. The group of 29 students was found to score lower on achievement tests and contributed in greater proportion to the number of third grade students enrolled in special education support services. These children had difficulty in developing appropriate language and academic skills. Cass & Kaplan (1979) also reported that children with auditory deprivation resulting from fluctuating hearing losses due to middle ear disease have difficulty in reading and language skills. These children may have difficulties paying attention, in auditory discrimination, and auditory processing. Bennett, Ruuska, & Sherman (1980) also investigated the association of chronic middle ear pathology and school learning problems. Results revealed that chronic middle ear pathology plays a significant role in the cause of language and learning disabilities. Early identification and referral for treatment of middle ear pathology were noted to reduce the risk of language and learning disabilities.

Northern, Kileny, Downs, Hayes, Gerkin, Bess, & Jacobson (1988) described the need for early identification of hearing loss in children. If hearing loss goes undetected and untreated, it can lead to delayed speech and language development and academic problems. If the hearing loss is detected early, and medical intervention given, collectively these should result in reduction of the possible handicaps in language and academics.

Collazo and Kricos (1986) studied the high prevalence of middle ear pathology in young children and its adverse effect on language

development. Results of this study indicate a strong and significant association between middle ear pathology and its adverse effect on speech and language development.

Downs (1987) reported that early recurrence of middle ear pathology and disease contribute significantly to language delays that tend to persist into school age. Early identification and alleviation of hearing loss resulting from middle ear disease can reduce the risk of language delays in school age children. Paden, Novak, & Beiter (1987) also concluded that fluctuating conductive hearing loss associated with middle ear pathology can result in delays in language acquisition, particularly phonologic development. The importance of early identification and appropriate medical treatment is also reported.

Brooks (1980) reported that the earlier hearing loss is identified, the earlier appropriate medical intervention can be delivered and the greater the chances of normal speech and language development. The longer the hearing loss goes undetected, the greater the chances of possible long-term consequences such as overall changes in the middle ear structures that may result in permanent hearing loss and the use of amplification.

The importance of early identification, diagnosis and alleviation of hearing loss resulting from conductive pathology and especially middle ear disease has been demonstrated throughout the literature. The research has shown that conductive hearing loss resulting from outer and middle ear pathology causes significant delays in language development and academic performance. Delays in early identification of hearing loss can only enhance the significant delays in language development and academic performance. Downs (1981) reported that the

largest number of problems a school system faces in the area of auditory disorders are the conductive hearing losses due to middle ear disease which result in language problems. Hearing losses resulting from middle ear pathology must be identified quickly and referred for immediate medical intervention. If these losses are identified and remediated properly, this detection would help reduce the risk of delays in language development and academic performance.

CHAPTER III

ANTICIPATED OUTCOMES AND EVALUATION INSTRUMENTS

Goals and Expectations

The goals of this practicum were to reduce the significant delays in referral to otologists for immediate medical care to alleviate conductive pathology and reduce the risk of delays in language and academic performance. Specific objectives included the identification of obvious conductive hearing losses at the school building level and the immediate referral to otologists for medical care. The writer expects to achieve the identification of possible hearing loss caused by obvious outer and middle ear pathology and to immediately refer these identified children to an otologist for appropriate medical intervention.

At the end of the three month implementation period, the writer expected to achieve the early identification of possible hearing loss caused by obvious outer and middle ear pathology, and to refer immediately these identified children to an otologist for immediate medical intervention. Success will be measured by the quality and quantity of referrals to the otologists. In addition, the number of children referred to the otologist will be tabulated as well as type of conductive pathology. The immediate referral of all children identified with obvious outer and middle ear pathology for elimination of possible hearing loss is the outcome expected as a result of this practicum. Once these children are recognized, the referral will be made.

Behavioral Objectives

The following objectives were projected for this practicum:

Objective 1: During the three month implementation, speech pathologists, after having been trained, will demonstrate knowledge on the anatomy and physiology of normal outer and middle ear structures with 80% accuracy measured by a diagrammatic examination constructed by the writer.

Objective 2: During the three month implementation, speech pathologists, after having been trained, will demonstrate skills in the use and operation of an otoscope by actual application on subjects as measured by observations by the writer.

Objective 3: During the three month implementation, speech pathologists, after having been trained, will demonstrate knowledge of the etiology of conductive hearing loss with 80% accuracy measured by a test instrument constructed by the writer.

Objective 4: During the three month implementation, speech pathologists, after having been trained, will demonstrate skills in identifying pathological conditions of the outer and middle ear structures with 80% accuracy measured by the identification of unlabeled color slides and photographs.

Objective 5: During the three month implementation, speech pathologists, after having been trained, will demonstrate knowledge of requirements and procedures for immediate otologic referral by 100% utilization of otologic referral form as measured by use of individual speech pathologists.

Objective 6: During the three month implementation, speech pathologists, after having been trained, will recognize obvious outer

and middle ear pathology in their schools and make immediate referral to otologists for intervention of possible hearing loss and reduction in delays in language development and academic performance measured by the quality, quantity, and types of conductive pathologies diagnosed.

Objective 7: During the three month implementation, otologists involved in the referral program will recognize the reduction in time from initial identification to referral of children with conductive pathologies as measured by responses from formal interviews.

Objective 8: Following the successful completion of the three month implementation, speech pathologists will continue to demonstrate their identification and immediate referral of obvious outer and middle ear pathologies as measured by the continued use of documentation of quality, quantity, and type of pathology.

Measurement of Objectives

Objective one was measured by the use of a written examination that was designed and administered by the writer (see Appendix A). This examination consisted of a diagram of the outer and middle ear structures that was unlabeled. It was required that the structures noted on the diagram be identified and the answers placed on the appropriate line. Mastery was defined as 80% of the structures correctly identified.

Objective two was measured through the writer's observations of the speech pathologists conducting otoscopic inspections on each other and subjects selected by the writer. Application and correct procedure was observed and scored on a pass/fail checklist (see Appendix B).

Objective three was measured by a written examination constructed and administered by the writer (see Appendix C). It required the

listing of five possible causes of conductive hearing loss. Presentation of listing four out of five possible causes constituted mastery.

Objective four was measured by the utilization of a response form for listing answers (see Appendix D). This response form was used to list the names of the unlabeled conductive pathology presented by color slides and pictures.

Objective five was measured by the use of an otologic referral form designed by the writer (see Appendix E). This form was sent to the otologist upon referral with a copy returned to the writer when child was seen.

Objective six was measured by an otoscopic referral checklist designed by the writer (see Appendix F). The checklist contained all necessary identifying information on the child. It had space for the results of otoscopic inspection and determination of otologic referral or not.

Objective seven was measured by a personal interview and review of referral forms and diagnosis from the local otologists. This interview was recorded on an interview form designed by the writer (see Appendix G). It was designed to determine whether delays in referrals for medical intervention exist.

Objective eight was measured through the tabulation of the quality, quantity and type of conductive pathologies identified and referred. This tabulation was taken from the otologic referral forms (see Appendix H).

Mechanism for Recording Unexpected Events

A log was kept during the three month implementation period.

Unexpected events that were not anticipated and may inhibit the success of the implementation were recorded (see Appendix I).

Description of Plans for Analyzing Results

Tables will be used to present and to analyze results to determine whether or not the objectives were achieved. The tables will present percentages indicative of mastery level on the designated assessment instruments utilized for each objective. Tables will also be used to display the number of referrals for otologic examination and type of diagnosed pathology.

CHAPTER IV

SOLUTION STRATEGY

Discussion and Evaluation of Possible Solutions

Early identification and referral of children with conductive pathology contributing to possible hearing loss is a recommendation found in the literature. Identification and immediate referral may be delayed if speech pathologists are unable to identify obvious conductive pathology. The literature offers suggestions for possible solutions to the problem of significant delays in referrals for immediate care resulting from speech pathologists' lack of training in otoscopic inspection and inability to recognize obvious outer and middle ear pathology. Hawke and Keene (1981) reported that it is with the ability and clinical skills to inspect, to understand, and to recognize pathological conditions in a diseased ear, that the speech pathologists will be better abled to make more immediate referrals to otologists for appropriate medical intervention. Many health care professionals experience problems in the examination of the ear due to the use of imperfect skills and a failure to identify important pathological conditions.

Garrard and Clark (1985) described the speech pathologist's role in identifying children with middle ear pathology resulting in possible hearing loss. The speech pathologists should provide hearing screening and be knowledgeable in identifying middle ear pathology and make immediate referrals for medical intervention. Speech pathologists should begin to fulfill a more active role in the identification,

management, and referral of children with middle ear disease.

The American Speech and Hearing Association (ASHA) (1989) in its guidelines for screening for hearing impairment and middle ear disorders, recommended that visual inspection of the ear canal and tympanic membrane should be included in hearing screening procedures. This inspection of the ear canal and tympanic membrane can result in the detection of outer or middle ear disorders requiring immediate referral to otologists. The ASHA guidelines state the following:

> Although many of these conditions may be missed by the relatively inexperienced otoscopist who may be administering the screening battery, inclusion of this component is expected to result in the early detection of conditions that may not be evident on other tests without harmful delays in medical attention (p. 72).

ASHA (1989) recommends that screening programs include methods for the identification of all peripheral auditory disorders. Screening programs should have a component for identification of children who have middle ear disorders. Pure tone screening should be accompanied by otoscopic inspection by professionals performing the screening.

Cass and Kaplan (1979) described pure-tone screening as not being sensitive to detection of medically significant problems caused by middle ear disease. The combination of pure-tone screening and otoscopy could better locate children who have minimal hearing losses caused by outer and/or middle ear disease that they can be referred for medical treatment.

Schwartz (1986) reported that within the last decade improved

methods for detecting middle ear pathology in children has flourished. One such procedure in combination with pure-tone screening is otoscopic inspection of the outer and middle ear structures. Otoscopic inspection allows for immediate identification of pathological conditions requiring medical referral.

Stata (1988) described pure-tone screening as the most-often-used of hearing tests, but it tells only half the story. It does not give or indicate the predominant cause of hearing loss in children. In addition to pure-tone screening, otoscopic inspection should be included in the screening program. Children suffering from obvious pathological conditions causing possible hearing loss can be identified with earlier referral for medical care.

Musket and Dworaczyk (1981) implemented the use of otoscopic visual examination as part of a school screening program. The otoscope was disguised as a hand puppet making it more acceptable to the children and expediting the screening. Visual inspection of the outer and middle ear structures is performed best with a hand-held otoscope, providing adequate illumination and magnification. Otoscopic visualization allows for the identification of a foreign object, impaction of cerumen, or middle ear disease.

Otoscopy is a procedure in which a trained examiner inspects the external ear canal and tympanic membrane using an instrument called an otoscope. Roeser and Northern (1981) reported that otoscopic inspection should be performed routinely as part of the hearing screening test battery. Otoscopy is a subjective technique and requires appropriate training and orientation of the examiner. It is important to refer children immediately when pathologies such as

cerumen impaction, foreign objects in the ear canal, and infection both in the outer and middle ear are found. Pure-tone screening alone is not effective in recognizing obvious conductive pathologies contributing to possible hearing loss.

A visual inspection of the ear canal and tympanic membrane should be the first step in pure-tone screening. This examination can give immediate evidence of pathological conditions requiring medical care. Hawke (1987) reported that visual clues in the form of significant changes in the color, texture, and surface areas of the external auditory canal and tympanic membrane will give evidence of diseases that affect the external and middle ear requiring immediate medical referral. The accurate identification of outer and middle ear pathology depends upon the sound clinical method of visual inspection of otoscopic visualization of outer ear and middle ear structures. Hawke, Keene, and Alberti (1984) described the use of clinical otoscopy by many health care professionals and that many examiners are unable to fully appreciate the significance of what is seen which makes the diagnosis and management of ear disease difficult and delayed. With training, experience, and sound clinical technique, ear pathology can successfully be diagnosed with immediate medical referrals being made to the otologists.

Otoscopic inspection as part of the hearing screening program is suggested throughout the literature review. Early identification of middle ear disorders contributing to possible hearing loss is also found in the literature of possible solutions. Although early identification of hearing loss with inclusion of otoscopic inspection is suggested, training in clinical technique is suggested for the

otoscopist. This technique will enhance the early detection of hearing loss and the pathological conditions that may be contributing to the losses. Referrals to otologists then can be expedited.

Evaluation of the possible solutions reported in the literature indicates that those individuals responsible for hearing screening should incorporate otoscopic inspection as part of the testing program. Appropriate training should be given to establish clinical skills to identify the obvious pathologies of the outer and middle ear structures. In addition, speech pathologists should take a more active role in identification and referral of children with obvious outer and middle ear pathology.

The writer believes that all of the solutions offered in the literature can be implemented with the designated population and in the writer's worksetting. The solutions can assist the writer in achieving his specific goals and objectives. These solutions can reduce the significant delays in referral to otologists thereby reducing the risk in delays in language and academic performance.

It is the writer's belief that otoscopic inspection should be added to the pure-tone screening program so that early identification and referral of children with obvious outer and middle ear pathology can be made to the otologists. The writer also believes that speech pathologists should be given appropriate training to develop clinical otoscopic skills.

Description and Justification for Solution Selected

The literature has provided a number of suggestions and recommendations to improve the early identification and referral of

children found to have possible hearing loss caused by obvious outer and middle ear pathology. This early identification and referral to otologists would reduce the risk of delays in language and academic performance if the pathologies received immediate medical intervention. Hawke and Keene (1981) recommended that speech pathologists become trained in clinical otoscopy for early identification of evident ear pathology. Garrard and Clark (1985) described the role of speech pathologists as one of being more active in identifying middle ear pathology by otoscopic inspection. Training in otoscopic inspection was recommended. ASHA (1989) recommends otoscopic inspection as part of the hearing screening program and that professionals providing this screening be trained in otoscopic inspection. Musket and Dworaczyk (1981) implemented a successful otoscopic visualization program in their local school system. Roeser and Northern (1981) reported that otoscopic inspection should be performed routinely in a public school hearing program.

The writer feels that the solution to the problem is to establish an inservice training program to train speech pathologists to perform otoscopic visualizations to identify obvious outer and middle ear pathology in preschool and school age children, and make immediate referrals to otologists for alleviation of the conductive pathology. This solution is the most appropriate because speech pathologists in the school system are concerned about early identification of hearing losses and immediate referrals to otologists. The writer feels that appropriate training in the application of otoscopy will improve the speech pathologists' clinical skills in performing this procedure and enhance identification procedures. The immediate referrals could then

alleviate the hearing losses and would reduce the risk of delays in language development and academic performance. This solution is the most appropriate solution because it relates directly to the literature in terms of the modern thrust and recommendations regarding the inclusion of otoscopic inspections as part of a public school hearing screening program. The writer feels that this solution addresses the problem and causes of the problem. It is also felt that the solution will achieve the stated objectives.

Report of Action Taken

The solution implementation strategy for this practicum began after receiving approval in July, 1989, to begin the implementation phase of the practicum.

Once this approval was obtained, the director of special education was consulted regarding permission to implement this practicum as part of the overall speech and hearing program. Permission was granted during the first week of August, 1989.

Once all appropriate permissions were obtained, the writer secured all necessary supplies, equipment, and materials through budgetary support from PL 94-142 and Preschool Flow-Through funds.

The writer then made all necessary preparations to conduct inservice training programs to the speech pathologists on the application of otoscopy as part of the hearing screening program. The writer provided six different inservice training programs and provided individual inservice training to all the speech pathologists.

The solution strategy for this practicum began with an initial

inservice training session for the speech pathologists. The speech pathologists were given an overview of the practicum problem and given the solution strategy. They were informed of their respective roles in the implementation of the solution strategy.

The second step of the solution strategy was the presentation of a second inservice training program that provided information to the speech pathologists on the anatomy and physiology of the outer and middle ear structures. A carefully designed lecture as well as selected slides and charts were used in this presentation.

The third step of the implementation strategy involved an inservice training program to the speech pathologists on the effects of conductive pathology and associated hearing loss on language development and academic performance. It was important that the speech pathologists became aware of the effects of minimal hearing losses on language development and academic performance. This was provided through the use of lectures, video recordings, and charts. In addition, recent studies concerning the effects of conductive pathology and hearing loss on language development and academic performance were distributed to the speech pathologists.

The fourth step of the solution strategy concerned the use of an otoscope and procedures for otoscopy. The speech pathologists were provided inservice training on the correct operations of an otoscope and acceptable procedures for doing an otoscopic visualization. Each speech pathologist was given an otoscope and given step-by-step directions regarding the operations of the otoscope. The application of otoscopy was demonstrated by the writer utilizing some of the speech pathologists as subjects. The writer then required the speech pathologists to pair

off and to practice otoscopic visualizations on their partner. Throughout this exercise, the writer carefully monitored each speech pathologist to determine correct operation of the otoscope and correct procedure for otoscopic visualizations. This inservice training was presented through the use of lecture, slides, video recordings and actual application of procedures.

The fifth step in the solution strategy involved an inservice training program on the otoscopic appearance of normal healthy ear structures as compared to abnormal and diseased structures of the outer and middle ear. This inservice training was presented through the use of lecture and color slides depicting normal versus abnormal and diseased structures of the outer and middle ear structures. In addition, each speech pathologist was given a clinical pocket guide to ear disease. This 136 page pocket guide provides easy access to color pictures of normal and healthy outer and middle ear structures, and provides detailed color pictures of every conceivable outer and middle ear pathology. The speech pathologists were instructed to utilize this guide to help them identify obvious outer and middle ear pathology. The writer carefully reviewed this pocket guide with the speech pathologists.

The sixth stage of the solution strategy concerned the actual application of the otoscope and otoscopic procedures through the use of on-hands application on children selected by the speech pathologists. This on-hands application was closely supervised by the writer to determine correct use of the otoscope and adequate otoscopic procedure. The writer worked with each individual therapist in their respective schools. Children selected for this on-hands application were children

failing the initial school hearing screening testing.

The seventh step in the solution strategy involved an inservice training program on requirements for immediate referral to otologists, utilization of the referral form, and medical and ethical information regarding otoscopic inspection of the outer and middle ear structures. This inservice training was presented by two local otologists who work closely in this writer's speech and hearing program. The otologists provided an overview of the anatomy and physiology of the ear and conductive pathology usually found in children. They provided information on correct procedures for referral of children found to have obvious outer and middle ear pathology. Instruction on the use of the referral form was stressed as well as medical and ethical considerations. The otologists stressed that the speech pathologists were only to identify and refer obvious outer and middle ear pathology, not to diagnose outer or middle ear pathology.

The eighth step of the solution strategy involved the administration of a comprehensive examination to the speech pathologists. The speech pathologists were given written examinations. The first examination required the speech pathologists to list five possible causes of conductive hearing loss (see Appendix C). The second examination required the speech pathologists to identify and list the names of unlabeled conductive pathologies presented by color slides and pictures (see Appendix D). The third part of the examination required that the speech pathologists demonstrate appropriate utilization and operation of the otoscope as well as adequate otoscopic skills. This was achieved by having the speech pathologists pair off and demonstrating their skills on each other. The writer used a pass/fail checklist to score

responses (see Appendix B). The final portion of the examination involved the identification of an unlabeled diagram of the outer and middle ear structures (see Appendix A).

The ninth step of the solution strategy involved the scoring of the examination. The writer scored each examination with mastery level for passage being set up at 80% accuracy. After the writer compiled the results of the examination, a final inservice training program was conducted with the speech pathologists. The speech pathologists were given their results and final instructions on identification of obvious outer and middle ear pathology and the immediate referral process to the otologists. The speech pathologists were instructed to implement otoscopic visualizations on every child given a hearing screening in the school system's speech and hearing program. They were then instructed to make immediate referrals to the otologists when an obvious outer or middle ear pathology was detected.

The final step in the solution strategy was the interview of seven local otologists regarding the overall implementation of this writer's practicum. The otologists were interviewed using a one page interview form that contained three questions. The three questions were in regards to the reduction in the amount of time from initial identification by the speech pathologists to the referral to the otologist's office, an appraisal of the clinical otoscopic skills by the speech pathologists, and any suggestions for improvement of this process.

During the three month implementation phase of this practicum, no significant deviations from the writer's plans were encountered as well as significant difficulties. One unexpected event was that two speech pathologists were absent for the second inservice training. This

was dealt with by conducting the inservice training with those individual speech pathologists. The only other unexpected event was the employment of two additional speech pathologists at the beginning of the year. This required the writer to purchase two additional otoscopes, books and other testing materials.

CHAPTER V

RESULTS, DISCUSSION, RECOMMENDATIONS, AND DISSEMINATION

Results

The problem that existed in this writer's work setting was that there were significant delays in referral to otologists for immediate medical care to alleviate hearing losses and reduce risk of delays in language and academic performance. This problem existed because speech pathologists did not possess the clinical skills in otoscopic inspection of the outer and middle ear structures. Specifically, they are unable to identify obvious conductive pathologies that require immediate referral for medical intervention.

The solution to the problem was to establish an inservice training program to train speech pathologists to perform otoscopic visualizations to identify obvious outer and middle ear pathology in preschool and school age children, and make immediate referrals to otologists for alleviation of the conductive pathology. The writer felt that appropriate training in the application of otoscopy would improve the speech pathologist's clinical skills in performing this procedure and enhance identification procedures. The immediate referrals could then alleviate the hearing losses and would then reduce the risk of delays in language development and academic performance.

The goals of this practicum were to reduce the significant delays in referral to otologists for immediate medical care to alleviate conductive pathology and to reduce the risk of delays in language and academic performance through inservice training on otoscopic inspection for speech pathologists.

Specific objectives were designed to achieve these goals. The following will be a list of each objective followed by the results related to that specific objective:

Objective 1: During the three month implementation, speech pathologists after having been trained, will demonstrate knowledge on the anatomy and physiology of normal outer and middle ear structures with 80% accuracy measured by a diagrammatic examination constructed by the writer.

The speech pathologists demonstrated complete mastery of the anatomy and physiology of the outer and middle ear structures. Results revealed 100% mastery for the 34 speech pathologists. The mean score was 99.41% with the mode being 100%. Only one speech pathologist scored at the minimum 80% level, the other 33 scored at the 100% level. Table 2 provides an illustration of the results for this objective.

Table 2

Speech Pathologists' Knowledge of Anatomy and Physiology of Outer and Middle Ear

Total Number of Speech Pathologists - 34

	Mastery	Percentage
Knowledge of Anatomy and Physiology	34	100%

Objective 2: During the three month implementation, speech pathologists, after having been trained, will demonstrate skills in the use and operation of an otoscope by actual application on subjects as measured by observations by the writer.

Application and correct procedure for the use and operation of an otoscope was observed and scored on a pass/fail checklist. Results for objective one, indicate 100% mastery by all of the speech pathologists. All speech pathologists scored at the 100% level. Table 3 summarizes the results for this objective.

Table 3

Speech Pathologists' Skill in Operation of Otoscope

Total Number of Speech Pathologists - 34		
	Mastery	Percentage
Skill in Operation	34	100%

Objective 3: During the three month implementation, speech pathologists, after having been trained, will demonstrate knowledge of the etiology of conductive hearing loss with 80% accuracy measured by a test instrument constructed by the writer.

Results of a written examination constructed and administered by the writer requiring the listing of five possible causes of conductive hearing loss, revealed that all speech pathologists achieved mastery at the 100% level. It should be noted that most of the speech pathologists listed more than the required five causes of conductive hearing loss. In some instances, speech pathologists listed causes that are rarely seen in the public school system. Table 4 describes the results for this objective.

Table 4

Speech Pathologists' Knowledge of Etiology of Conductive Hearing Loss

Total Number of Speech Pathologists - 34

	Mastery	Percentage
Knowledge of Etiology	34	100%

Objective 4: During the three month implementation, speech pathologists, after having been trained, will demonstrate skills in identifying pathological conditions of the outer and middle ear structures with 80% accuracy measured by the identification of unlabeled color slides and photographs.

The results obtained for this objective, revealed 100% mastery for all speech pathologists. All of the speech pathologists were able to identify the unlabeled conductive pathologies presented to them on color slides and pictures. Table 5 summarizes the results for this objective.

Table 5

Speech Pathologists' Skill in Identifying Pathologists of Outer and Middle Ear

Total Number of Speech Pathologists - 34

	Mastery	Percentage
Skill in Identifying Pathologies	34	100%

Objective 5: During the three month implementation, speech pathologists, after having been trained, will demonstrate knowledge of requirements and procedures for immediate otologic referral by 100% utilization of otologic referral form as measured by use of individual speech pathologists.

Results regarding objective five, reveal 100% mastery of the use of the referral form. All of the speech pathologists have made referrals to local otologists utilizing this form. All of the forms have been and are continuing to be sent back to the writer. A summary of the results for this objective are found in Table 6.

Table 6

Speech Pathologists' Knowledge of Requirements for Immediate Referral

Total Number of Speech Pathologists - 34

	Mastery	Percentage
Requirements for Immediate Referral	34	100%

Objective 6: During the three month implementation, speech pathologists, after having been trained, will recognize obvious outer and middle ear pathology in their schools and make immediate referral to otologists for intervention of possible hearing loss and reduction in delays in language development and academic performance measured by the quality, quantity, and types of conductive pathologies diagnosed.

A review of the checklists utilized by the 34 speech pathologists, revealed that a total of 944 students were given pure-tone screening and otologic visualizations. Out of the 944 students, 862 were found to

have acceptable hearing and no obvious outer and middle ear pathology. The number of children referred for otologic examination because of obvious outer and/or middle ear pathology was 82. These children were referred to the otologist on the same day that they were identified as having an obvious outer and/or middle ear pathology. Parents of these children were contacted by telephone or letters informing them of the need for immediate otologic care. Table 7 provides a summary of the results obtained for this objective.

Table 7

Speech Pathologists' Recognition of Obvious Outer and Middle Ear Pathology

Total Number of Speech Pathologists - 34		
	Mastery	Percentage
Recognition of Pathology	34	100%

Objective 7: During the three month implementation, otologists involved in the referral program will recognize the reduction in time from initial identification to referral of children with conductive pathologies as measured by responses from formal interview.

Personal interviews were conducted with seven local otologists. A review of the referral forms and diagnosis from the local otologists were discussed in regards to the amount of time from initial identification to final diagnosis by the otologists. The otologists stated that there was a considerable reduction in time from initial identification by the speech pathologists to final diagnosis and treatment

by the otologists, based on the date of referral versus the date the otologist saw the child. In all cases referral was achieved within a week. The otologists expressed their pleasure in having these direct referrals of obvious outer and middle ear pathologies from the school system's speech pathologists. They also expressed their continued support and praised the speech pathologists' clinical skills in otoscopic inspection and identification of obvious outer and middle ear pathologies. Table 8 depicts the results obtained for this objective.

Table 8

Otologists' Recognition of Reduction in Referral Time

Total Number of Otologists - 7

	Number	Percentage
Recognition of Reduction	7	100%

Objective 8: Following the successful completion of the three month implementation, speech pathologists will continue to demonstrate their identification and immediate referral of obvious outer and middle ear pathologies as measured by the continued use of documentation of quality, quantity, and type of pathology.

A tabulation of the quality, quantity, and type of conductive pathologies identified and referred, reveal that a total of 944 children were given otoscopic visualizations during the three month implementation. Out of this number, 862 were found to have normal hearing acuity and no obvious conductive pathology. There were 82 children identified as having obvious outer and middle ear pathology. All of these

children were referred to the otologists and were confirmed by the otologist's diagnosis to have some type of conductive pathology. Otitis media was found in 66 of the children referred. Cerumen impaction was found in 12 of the children with four children having foreign objects found in the ear canals. These foreign objects consisted of cotton, small beads and erasers. Results revealed and confirmed that the speech pathologists had gained sufficient knowledge in performing otoscopic inspections, identifying obvious outer and middle ear pathology, and making immediate referrals for medical intervention. Table 9 gives a breakdown of the children referred and the results obtained for this objective.

Table 9

Children Referred for Otologic Evaluation

Total Number of Children - 82

	Number	Percentage
Diagnosed Pathologies	82	100%

It should be noted that at the writing of this report, referral reports from the local otologists continue to come in daily.

Discussion

A review and interpretation of the data indicates that all eight objectives were achieved, indicating that the goals of reducing the significant delays in referral to otologists for medical care to alleviate conductive pathology and reduce the risk of delays in language and academic performance were achieved and will continue to be achieved

throughout the remainder of the school year.

The results confirmed the writer's expectations that speech pathologists could be trained to identify obvious outer and middle ear pathology and that immediate referrals for medical intervention to alleviate these possible hearing losses due to conductive pathology could result. Based on the results, all objectives were achieved.

A review of the literature reveals that others have met similar positive results in utilizing the solution strategies chosen by the writer. Musket and Dworaczyk (1981) implemented a training program to train speech pathologists in the use of otoscopic inspection in a hearing screening program. Their results were found to be positive. Stata (1988) produced similar results in a training program for speech pathologists to conduct otoscopic inspections of the outer and middle ear structures. In comparison to the works of others, this writer achieved similar positive results.

Since all the goals and objectives were met, several implications became obviously apparent. Speech pathologists are now more acutely aware that conductive pathology and possible hearing loss may have a detrimental effect on language development and academic performance. This necessitates early identification and more immediate referrals to the medical specialists. Children can now be referred directly from the school building level to the otologists, because the speech pathologists are properly trained in conducting otoscopic inspection of the external ear canal and tympanic membrane. Specifically, they are able to identify obvious conductive pathologies requiring immediate medical attention. The most important implication flowing from the success of this practicum is the administration's desire to continue the program at the

level at which it is functioning and to provide similar training to newly employed speech pathologists.

The writer experienced only one unanticipated outcome that is very positive and helped in the success of this practicum. This outcome was the extremely high level of interest shown by the administration, the participating otologists and in particular, the speech pathologists. All of them went beyond the initial requests made of them to insure the success of the practicum. This indicates an awareness of early detection and immediate referral of children found to have obvious conductive pathology.

Based on the results obtained from the data relating to each objective, the writer concludes that speech pathologists who participated in the practicum, are knowledgeable in the anatomy and physiology of normal outer and middle ear structures and the etiology of conductive hearing loss. The writer believes that the speech pathologists who were trained possess adequate skills in identifying pathological conditions of the outer and middle ear structures by otoscopic visualization and making immediate referrals for medical intervention. The writer believes that the speech pathologists are now able to identify obvious conductive hearing losses at the school building level, make immediate referrals for medical intervention, and thereby reduce the risk of significant delays in referral and reduce the risk of delays in language and academic performance.

Recommendations

1. It is recommended that any replication of this practicum be implemented for a nine-month period.

2. It is recommended that the medical specialists be involved in

the inservice training earlier than was done in this practicum.

3. It is recommended that tympanometry be added to the otoscopic visualizations to verify conductive pathology at the school building level.

4. This practicum will continue on an ongoing basis in this writer's school system, and remain a requirement in the school system's hearing conservation program.

Dissemination

This practicum has been shared with a graduate program in early childhood education at a local university.

The writer will also share the practicum results with other audiologists and speech pathologists at a state association conference of speech pathologists and audiologists to be held in February, 1990.

The writer will also submit copies of the practicum to the American Academy of Audiology for possible inclusion as a short course at its annual meeting to be held in April, 1990.

The writer plans to submit the practicum results to the state department of education for possible inclusion as a workshop at the annual special education super-conference to be held in March, 1990.

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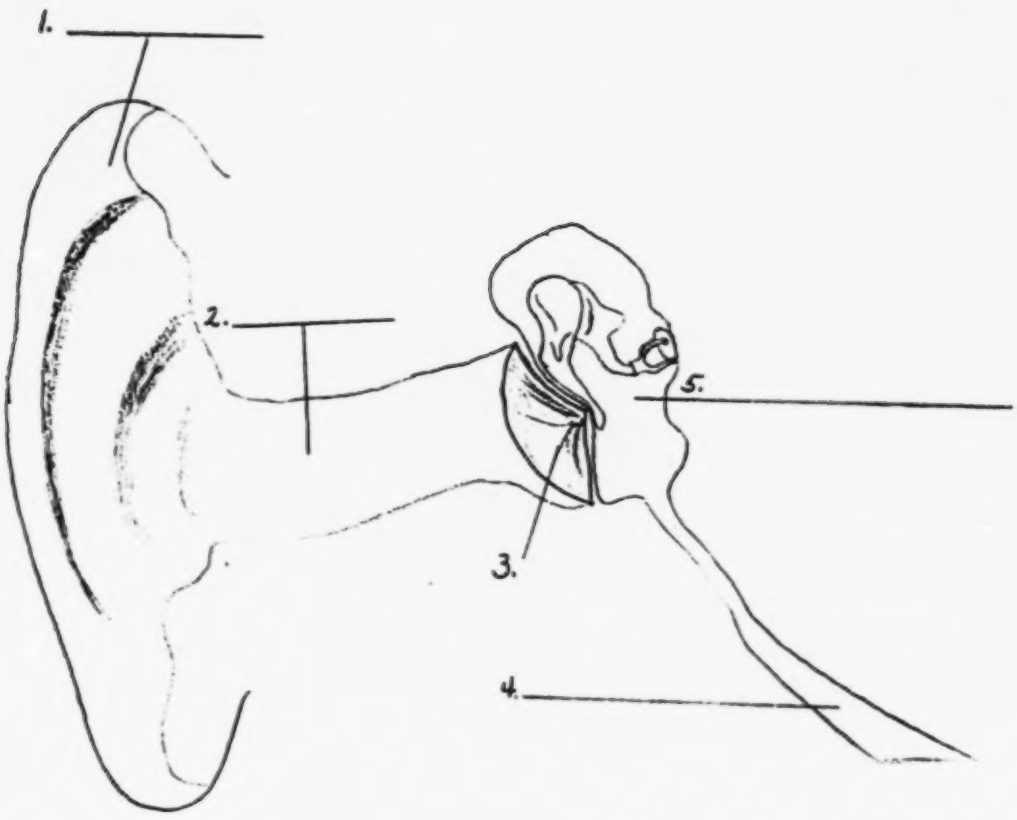
APPENDIX A

UNLABELED DIAGRAM OF EAR

Unlabeled Diagram of Ear



APPENDIX B

PASS/FAIL CHECKLIST

Pass/Fail Checklist for Otoscopic Procedure

Speech Pathologist _____	Pass	Fail
1. Turning otoscope on and off	_____	_____
2. Holding otoscope	_____	_____
3. Speculum in the ear canal	_____	_____
4. Holding external ear and position	_____	_____
5. Movement of otoscope in ear canal	_____	_____

_____

Observer

APPENDIX C

WRITTEN EXAMINATION

Written Examination

Name _____

Instructions: Name five causes of conductive hearing loss in children.

1.

2.

3.

4.

5.

APPENDIX D

RESPONSE FORM

Response Form for Identification of Unlabeled Slides

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

_____

Speech Pathologist

APPENDIX E

OTOLOGIC REFERRAL FORM

Pure Tone Screening and Otoscopic Inspection and Referral Form

NAME: _____ DATE: _____

SCHOOL: _____ SPEECH PATHOLOGIST: _____

GRADE: _____

AGE: _____

I. HEARING SCREENING (Screen at 20dB HL)

	500 Hz	1000Hz	2000Hz	4000Hz
Right Ear				
Left Ear				

P = Pass
F = Fail (Perform Threshold Testing)

II. OTOSCOPIC INSPECTION (Perform on all students)

____ Normal

_____ Cerumen Impaction

_____ Foreign Object

_____ External Otitis

_____ Otitis Media

_____ Abnormality of External Ear

_____ Perforated Tympanic Membrane

_____ Scarred Tympanic Membrane

_____ Drainage

_____ Atresia

_____ Stenosis

_____ Collapsed Canal

_____ Other (Describe) _____

III. RECOMMENDATIONS

1. _____ Refer immediately to otologist

2. _____ Refer for audiological evaluation

3. _____ Acceptable hearing acuity

4. _____ Acceptable outer and middle ear structures

_____

Speech Pathologist

APPENDIX F

OTOLOGY EXAMINATION FORM

Otology Examination Form

NAME: _____ BIRTHDATE: _____

SCHOOL: _____ GRADE: _____

PARENTS: _____ DATE OF REFERRAL: _____

SPEECH PATHOLOGIST: _____ DATE OF EXAMINATION: _____

Otological Examination

Ears:	Right	Left
Normal	____	____
Foreign Object	____	____
Cerumen Impaction	____	____
Tympanic Perforation	____	____
Tympanic Membrane		
Retracted	____	____
Scarred	____	____
Otitis Media	____	____
Infection	____	____
Drainage	____	____
External Otitis	____	____

Diagnosis

	Right	Left
Hearing Normal	____	____
Conductive Loss	____	____
Sensorineural Loss	____	____
Mixed Loss	____	____

Probable Etiology

Acute Otitis Media ____

Chronic Otitis Media ____

Adhesive Otitis Media ____

Tympanic Perforation ____

Cerumen Impaction ____

Eustachian Tube Pathology ____

Foreign Object ____

Recommendations

Allergic Care ____

ENT Treatment ____

Preferential Seating ____

Audiological Evaluation ____

Recheck in: _____

Comments: _____

_____

_____

_____

Otologist

APPENDIX G

OTOLOGIST'S INTERVIEW FORM

Otologist's Interview Form

1. Have you found a reduction in the amount of time from initial identification by the speech pathologists to referral to your office? (Review referrals to otologist's office)

2. Do you feel that the speech pathologists possess appropriate clinical skills for otoscopic inspection?

3. Do you have any suggestions for improvement of this process?

APPENDIX H

TABULATION FORM

Tabulation Form

Part I

Number of Children Evaluated _____

Number with Normal Hearing Acuity _____

Number Referred for Otologic Examination _____

Number Identified with Conductive Pathology _____

Part II

Type of Conductive Pathology Identified by Otologists

Cerumen Impaction _____

Foreign Object _____

Otitis Media _____

Perforated Tympanic Membrane _____

External Infection _____

Drainage _____

APPENDIX I

DAILY LOG FORM

Daily Log Form

Date: / /

APPENDIX J

LIST OF SUPPLIES, EQUIPMENT AND MATERIALS

List of Supplies, Equipment and Materials

40 - Welch Allyn Halogen Otoscopes

40 - Clinical Pocket Guides to Ear Disease

1 - Clinical Atlas of Otoscopy

40 - Boxes of Alcohol Swabs

2 - Video Tapes:

a) How to use an Otoscope

b) Detecting Middle Ear Effusion

1 - Tray Color Slides of Anatomy of Outer and Middle Ear

1 - Tray Color Slides of Pathological Conditions of Outer and Middle Ear Structures